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DEEP SOUNDING OF THE MOON

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DEEP SOUNDING OF THE MOON*

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ABSTRACT

Investigations of Moon's radio emission were carried out in the USSR during the last few years in wavelengths from 0.13 to 35 cm, corresponding to "survey" of Moon's superficial layer from 5 to 20 meters.

Lately, radioastronomers conducted a new, and still deeper sounding of our natural satellite. Radiowaves brought data from depths near 40 meters. The following has been communicated by the Gor'kiy Radiophysical Institute of Scientific Research to the Newspress Agency.

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As is well known, the only source of information on the Moon as well as other celestial bodies has been for a long time the light reflected by them. Lately, not only the visible light, which gives data on only the surface of the celestial body, but also the electromagnetic oscillations, invisible to the naked eye, could be percei d with the aid of the improved scientific apparatus, and this includes the thermal infrared rays. It was revealed in 1946 that the Moon is a source of radio emission. Radiowaves resulted to be a powerful means of broadening our knowledge on the nature of our satellite. Their interests resides in that they allow a "look" under the lunar surface,

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* GLUBOKOYE ZONDIROVANIYE LUNY.

for waves of various lengths reach us from different layers of the Moon. It is established, that radiowaves of greater wavelengths reach us from greater depth of a celestial body similar to the Moon.

As already reported to the press, a group of Soviet scientists under the leadership of Dr. V. Troitskiy, carried out measurements of Moon's radio emission. Thanks to the new method applied, an exclusively high, yet unattained precision has been achieved, with an error not exceeding 1 to 2 percent.

The most interesting result was the discovery of temperature rise with depth. At 20 meters, corresponding to 35 cm wavelength, the temperature is almost by 25° higher than at the surface.

Radioastronomical investigations conducted in wavelengths shorter than 10 cm have shown that the upper mantle of the Moon, 1.5 to 2 meters thick, is uniform as far as the density is concerned. The matter near the surface appeared to be twice as light as the water. Earlier, it was estimated that the density of surface matter was twice that of water. As to heat conductivity of that substance, called in laboratory as "lunite", it is by about 40 — 50 times greater than thought earlier. The data obtained indicate that the lunite apparently is not a dust layer, but rather corresponds to solid, uniform, but porous substance, analogus to pumice.

What do the deeper layers of the Moon represent? So far, this remained unknown. Only lately, Soviet radioastronomers Troitskiy, V. Krotikov and N. Tseytlin managed to conduct new and complex radio-measurements — deep sounding of the Moon. Measurements of radioemission were conducted at 70 cm, i.e. twice the wavelength that gave data from 20 meter depth.

Scientists should have obtained informations on the depth of near 40 meters. It was expected in this case, that, as the depth increased, the density of the lunar matter remained unchanged and that a

temperature accretion by 20 — 30 degrees by comparison with that at 20 meters would be revealed. However, the accretion resulted to be much less. This attests to the fact that at 30 meters, there is already a rather dense layer, possibly a rock formation.

Therefore, the preliminary data obtained point to the fact that the 30-meter porous layer apparently overlies its hard rock formations.

The investigations of the Moon continue. Detailed results will be published in scientific communications.

(NPA)

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